

Archaeological and Biological Examination of
the Marker 39 Wreck (8MO1931)
off Key Largo, Monroe County, Florida

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A Report by the Florida Underwater Archaeology Team,
Bureau of Archaeological Research, Division of Historical Resources,
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Acknowledgments

Principal participants included Dr. Roger C. Smith, Daniel McClarnon, and Franklin H. Price of the Bureau of Archaeological Research (BAR), and Brenda Altmeier of the National Oceanic and Atmospheric Administration's (NOAA) Maritime Cultural Heritage Program (Fig. 1). Valuable assistance for the project was provided by John Halas and Lauri MacLaughlin of the Florida Keys National Marine Sanctuary (FKNMS), Tim Runyan of NOAA's Maritime Cultural Heritage Program, Fred Gaske and JuDee Pettijohn of the Florida Department of State, Dr. William Fitt of the University of Georgia, Dr. Cortland F. Eble of the University of Kentucky, Matthew DeFelice of the Broward County Historical Commission, and Dan Gallagher of the City of Marathon Historic Commission.



Figure 1: Marker 39 Research Team (from Left to Right): Franklin H. Price, Roger C. Smith, Daniel McClarnon, and Brenda Altmeier.

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Introduction

The Marker 39 Wreck was first recorded by Florida Keys National Marine Sanctuary Submerged Resource Inventory (SRI) volunteers Chuck Hayes and Denis Trelewicz in 1994. The site was incorporated into Volume III of the *Underwater Resources of the Florida Keys National Marine Sanctuary Northeast Region* and given the site number W-03-TG (W=Historic Shipwreck, 03= numerical sequence of each zone, TG= zone code for Triangles). Sanctuary staff, accompanied by Joe Cozzi, visited the wreck in 2007 as part of a Preserve America Initiative grant project. In 2008 John Halas and Brenda Altmeier recommended that the site receive further investigation and recording during a 2009 partnership between BAR and FKNMS. Planned for the month of June, the project obtained financial support from Dr. Tim Runyan of NOAA's Maritime Heritage Program. Archaeologists conducted fieldwork between June 3 and June 20, 2009. This three-week period was characterized by good weather, with light winds and calm seas. Underwater visibility generally ranged from very good to excellent.

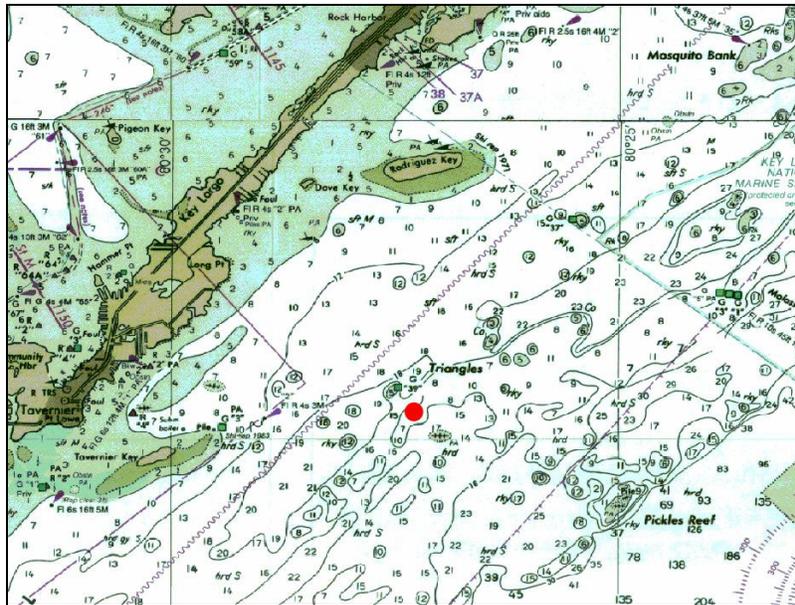


Figure 2: Marker 39 Wreck Location

Research Design and Proposal

Given the cooperative relationship between staffs of FKNMS and BAR, resulting from a 1988 Programmatic Agreement (between NOAA and the State of Florida for Historical Resource Management in the FKNMS), it was proposed that the two staffs continue to work together to record and assess known shipwrecks within the Sanctuary. The Research Design submitted to NOAA briefly described the Marker 39 Wreck and its current status. Photographs of the surviving structure and site features were included. Staff from both agencies, consisting of a team of archaeologists to investigate, document, and study the remains of the shipwreck, would conduct the investigation. Assessment data would be assembled to produce a report detailing the site's history, biology, overall condition, and suggestions for future research and minimizing visitor impact on cultural and natural features.



Figure 3: State Vessels on Site

Marker 39 Project

A plan of action for fieldwork from June 3 to June 20 called for assembling a team of researchers consisting of Roger C. Smith, Dan McClarnon, and Franklin H. Price of BAR, and Brenda Altmeier of NOAA's Maritime Heritage Program. The team gathered at Port Largo in Key Largo, where NOAA R/V *Odyssey* was docked. Field

headquarters were split between the vessel and the Key Largo Marine Research Laboratory headed by Dr. William Fitt of the University of Georgia. Survey equipment, including two state boats (R/V *Workhorse* & R/V *Scout*) accompanied the state team, and diving gear was supplied by both agencies.

Fieldwork

Diving Operations:

Each day R/V *Workhorse* (21-ft. Offshore) and/or R/V *Scout* (18-ft. Angler) traveled to the location of the Marker 39 Wreck site and moored to a temporary buoy installed for the project (Fig. 3). Diving operations consisting of buddy teams using open-circuit SCUBA proceeded from the two vessels. Both boats carried safety equipment, including first aid and oxygen.

Brenda Altmeier maintained a single dive log throughout the project for all divers. Because the depth of the site is less than 30 ft., decompression limits were not applicable. Archaeological divers worked approximately 44 hours of total bottom time. Media coverage and biological evaluation accounted for another 3.5 hours of dive time.



Figure 4: Diver Making Sketch Plan

Mapping:

Archaeologists laid a fiberglass baseline along the center of the remaining structure. Graduated in feet and tenths, it measured 156 ft. in length and was tied to iron stakes placed at either end of the site on a magnetic bearing of 330°. The baseline aided photogrammetric techniques to produce a site plan. The stakes established two datum points: 'A' to the north and 'B' to the south, with the northern datum acting as the zero point on the baseline. The next step involved the production of a sketch plan, showing visible parts of the structure and major features (Fig. 4). Measurements using 90° offsets taken from 10-ft. intervals along the baseline aided in the reconstruction of the outermost edges of the site in plan view. Investigators uncovered and inspected a small portion of

the ceiling planking, floor timbers, and outer hull planking at the southeastern side of the wreck. A similar test excavation on the western side determined the dimensions of the floor timbers. Hand fanning of the timber structure at the center exposed ceiling planking.

Metal Detector Survey:

A metal detector survey of the site, starting at the 'B' datum and proceeding in a clockwise direction, consisted of marking buried metal targets with red pin flags. The metallic boundaries of the site extended farther than the uncovered structure, indicating that metallic elements remain buried in the sediment on either side of the exposed wood. These locations, recorded in 90° offsets from the baseline, indicated that the metallic anomalies were in some places close to 10 ft. beyond the unburied parts of the wreck.

Photographic Recording:

Extensive coverage of the site was obtained with digital still photography and digital video. Photographs included plan views, profiles, work shots both above and below water, as well as images of marine life. Using Adobe Photoshop CS2, Brenda Altmeier stitched together a series of photographs taken at 5 ft. depth below surface with an Olympus 70/70 camera to create a mosaic of the site (Fig.10). Archaeologists used the photo-mosaic to provide spatial information for a site sketch plan that depicts structural elements and marine life such as corals and sponges (Fig. 11).



Figure 5: Associated Press Interview

Media Coverage:

Associated Press (AP) reporter Lisa Orkin Emmanuel and photographer Wilfredo Lee visited the site. They interviewed the staff, visited the wreck, and took photographs

(Fig. 5). Their story went out on the AP wire, and was published both online and in various newspapers (See Appendix I).¹

Site Description

The site is situated near an area known as the Triangles, in Hawk Channel, approximately 500 yards offshore of Marker 39 near Key Largo, Florida. The wreck rests in 15 to 20 ft. of water, deepest at the offshore end. The structure acts as a substratum for marine life as an artificial reef. Surrounded by turtle and manatee seagrass patches, the wreck has produced a halo effect in the grass beds, settling in a scoured pocket of exposed bottom sediments composed of carbonate sand and silt. Visibility at the site depends on weather, winds, and tides.

Marine Life Survey

During the project, investigators observed numerous species of marine life inhabiting the immediate vicinity of the wreck including crustaceans, fish, corals, and marine plants. A biological survey recorded the presence and populations of fish, invertebrates, sponges, algae, corals, and seagrasses (See Appendix II).



Figure 6: Wreck Structure

Site Features

The site consists of the lower hull of a heavily-built seagoing vessel, collapsed, flattened, and eroded on the seabed (Fig. 6). It is covered with a dense growth of soft and hard corals, and associated resident and pelagic fish. The wreck runs in a northwest to

¹ Lisa Orkin Emmanuel, "Science aids inventory of Florida Keys shipwrecks," *Miami Herald.com*, June 13, 2009, www.miamiherald.com/news/florida-keys/story/1095092.html (accessed July 9, 2009)

southeast direction at a bearing of 330° magnetic, and stretches 150 ft. in length with exposed portions a maximum of 20 ft. wide, although the outer sections appear to be buried. Several iron pipes of two different diameters lie on the upper surface of the hull, as well as a large number of heavy iron fasteners that have become detached from the structure. A line of iron bolts, covered with octocorals, are embedded upright in the timbers running longitudinally on the west side.

Architecture and Other Features

Floor Timbers:

Three small areas of the site were tested with light excavation; otherwise investigators recorded only portions of the wreck that were already exposed above the sand. The structure consists of heavy wooden frames, or floor timbers, set closely together measuring 13 in. of sided thickness and 13 in. of molded height, although some exhibited a sided thickness of 12 in. (Fig. 7).



Figure 7: Floor Timbers

Room and space is variable.

Ceiling Planking or Stringers:

On top of the floor timbers heavy drift bolts fasten longitudinal planking in place. These run fore and aft and resemble ceiling planks except for their unusually large dimensions. They have a sided thickness of 13 in., and 8 in. of molded height. Where they were bolted the upper surface of the planks has been preserved by iron oxide impregnation, but between these fortified areas the surface is badly eroded.

Fore and Aft Bulkhead:

On either side of the structure there appears to have been a fore and aft bulkhead that was fastened edge-on with through bolts. Only some of the disarticulated bulkhead is visible, the lower portion remains but the upper part has collapsed.

Outer Hull Planking:

Outer hull planking, partially excavated on the southeastern side, appears to be pine. Archaeologists recorded two dimensions (Fig. 8). The first was 2½ in. of molded height by 12 in. of sided thickness. The second example had a molded height of 3 in. and 7 in. of sided thickness.

Pipes:

Pipes of two sizes were recorded. The smaller have an outer diameter of 3½ in. and a 2¾ in. inner diameter. Several of these smaller examples rest on site. A larger pipe with an outer diameter of 6½ in. and an inner diameter of 5¾ in. ends in an enclosed cap with an 8 in. outer diameter (Fig. 9).



Figure 8: Investigating the Outer Hull Planking

Other Features:

Pieces of coal, predominantly with angular edges, are spread across the site. They range in size from pebbles to examples almost two feet across. Within the structure are also small pieces of flat, compact, heavy stone, appearing to be sedimentary. Not enough of these pieces are present to have been ballast for a sailing vessel. They appear to be part of the coal matrix. Investigators collected coal and stone samples for analysis. Although no contemporary diagnostic artifacts were observed, investigators noted some modern beer bottles and trash, along with fishing line and weights. Several deteriorated lobster traps with associated hardware and rigging are strewn throughout the site.

Archaeologists did not observe any sailing ship apparatus, such as elements of standing or running rigging, nor were any scuppers, hawse-pipes, steering mechanisms, or rudder fittings noted. When this negative evidence is taken into consideration along with the lack of ballast, the function of the wreck as a sailing vessel is doubtful. Similarly, an absence of visible steam machinery, such as boiler brackets, valves, cylinders, pistons, motor mounts, pillow blocks, or propeller shafts likely preclude its identification as a steamer.

Near the north datum John Halas discovered an area of disassociated wood and fasteners containing a part of rubber and fabric that may have been associated with the site, but also may have been a modern intrusive oilskin or a tarp fragment, trapped among the debris. Adjacent to the wooden structure, on the east side,



Figure 9: Piping

are the partial remains of a metal object that appears to have been a container, made of ferrous material, that may have been associated with the wreck. A search of the surrounding sand scour and seagrass beds yielded no other potentially associated artifacts or structure.

Artifacts

During investigations of the Marker 39 Wreck researchers recovered a few samples of coal and stone, but noted no contemporary diagnostic artifacts. Dr. Cortland F. Eble of the University of Kentucky analyzed the coal and stone samples. The coal was identified as late Pennsylvanian (300 million years old) or early Permian (275 to 300 million years old). The results of palynological examinations are consistent with coal from five potential locations: the Illinois Basin, eastern Ohio and southwestern Pennsylvania, northeast Kentucky and west central West Virginia, southeastern Kansas, and north central or trans-Pecos Texas. Commonly referred to as “sulfur balls,” made of pyrite and marcasite, the stone samples were identified as part of the coal matrix.

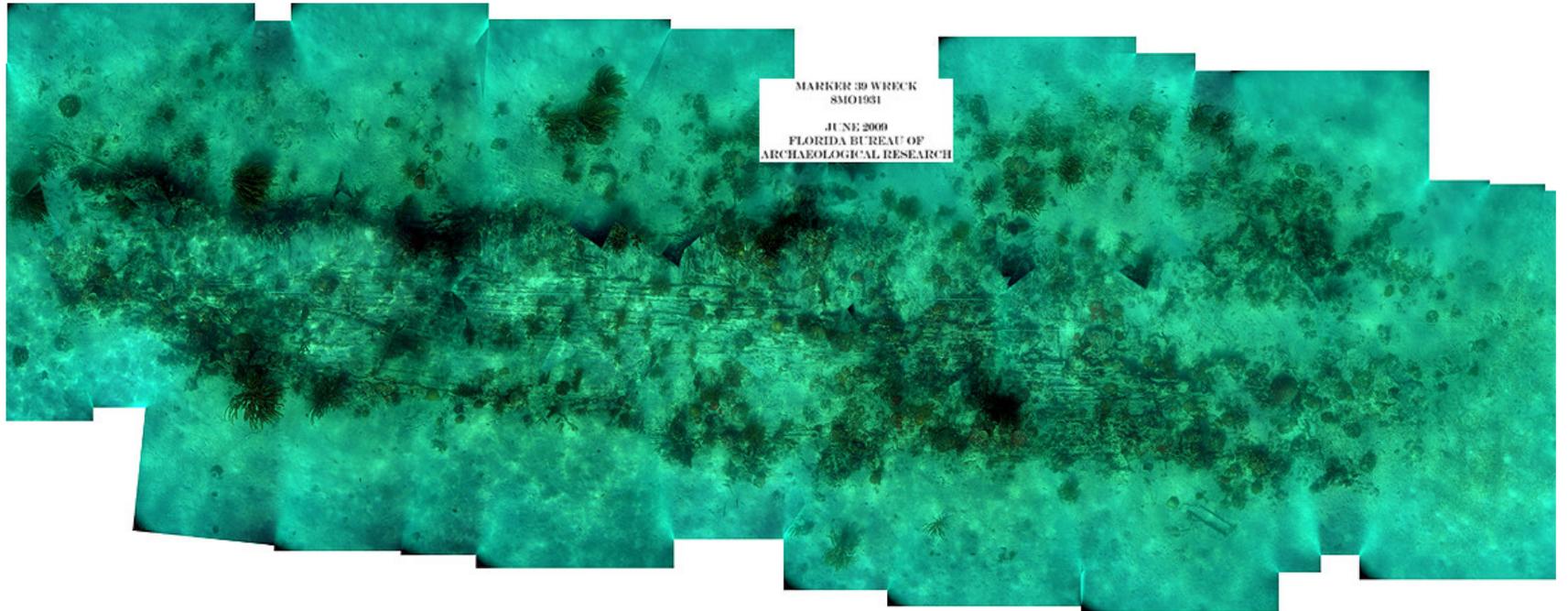


Figure 10: Photo-mosaic of Marker 39 Wreck (Brenda S. Altmeier)

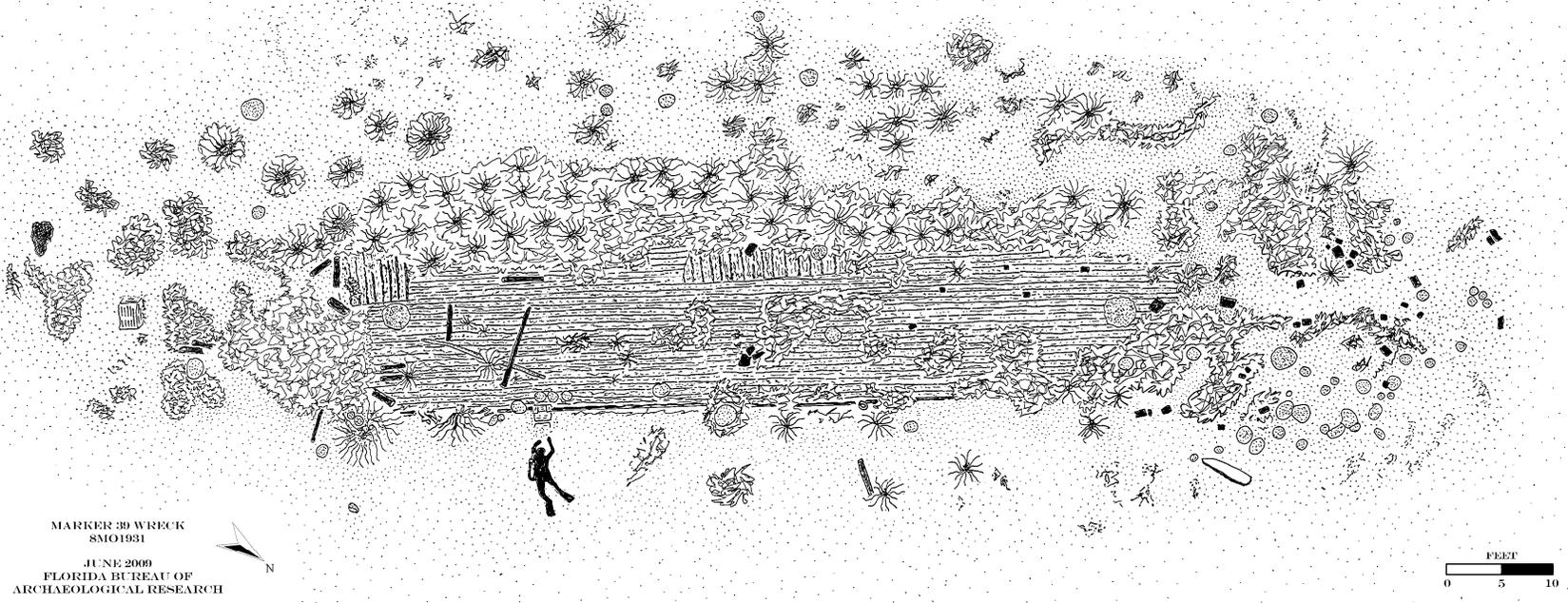


Figure 11: Site Plan of Marker 39 Wreck

Discussion

Historical Context

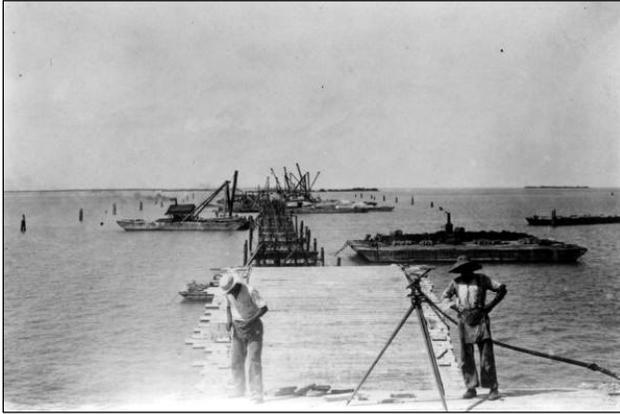


Figure 12: Overseas Railway Extension with Barges, 1907 (Courtesy of State Library and Archives of Florida, Florida Photographic Collection)

The Florida Keys experienced a period of transition during the late 19th and early 20th centuries. In the years following the Civil War, the population was concentrated on Key West. Mostly occupied by farmers and seamen, the middle and upper Keys provided crops, fish, and sponges for flourishing Key West markets.² Many had left the wrecking business with the start of the Civil War, although it continued as a livelihood for some until 1921.³ The nearest wrecking village to the Marker 39 Wreck appears to have been at Indian Key.⁴ The Union blockade of the southern ports had significantly reduced maritime traffic.⁵ Shipping increased following the war, but was challenged by the introduction of railroads to the area. An extension of Florida's East Coast Railroad (FEC) to Key West hoped to capitalize on new opportunities for American business in Latin America and the Caribbean, notably those arising from the Panama Canal (Fig. 10).⁶ The maritime industry changed to accommodate the new era of construction and expansion as numerous watercraft were employed in building the railroad.⁷

² John Viele, *The Florida Keys Volume 1: A History of the Pioneers* (Sarasota: Pineapple Press, 1996), 81-82.

³ John Viele, *The Florida Keys Volume 3: The Wreckers* (Sarasota: Pineapple Press, 2001), 189.

⁴ Jeane Eyster and Irving R. Eyster, *Islamorada and More* (Marathon: Pigeon Key Foundation, 1997), 19.

⁵ Eloise Engle and Arnold S. Lott, *America's Maritime Heritage* (Annapolis: Naval Institute Press, 1975) 179-181.

⁶ Samuel Proctor, "Prelude to the New Florida, 1877-1919," in *The New History of Florida*, ed. Michael Gannon (Gainesville: University Press of Florida, 1996), 269-271.

⁷ Dan Gallagher, *Florida's Great Ocean Railway* (Sarasota: Pineapple Press, 2003), 16.

The Overseas Railroad had been completed as far as Knight's Key by 1908 and reached Key West in 1912.⁸ The railroad moved the Keys into the new century, ushering in an era of population growth and cultural change. Not only could goods move more freely to and from the Keys, but travelers and fishermen from the mainland visited the islands with greater ease. Construction of the railroad also brought new types of vessels; large steamboats and construction barges carried fill material, wood, and steel to every channel and pass (Fig. 11).⁹



Figure 13: Engine on Barge, Key Largo, 1906.
(Courtesy of State Library and Archives of Florida, Florida Photographic Collection)

In 1923 the Overseas Highway project began. Supplemented by railroad cars, steamers and barges continued the construction well into the late 1930s. The devastating hurricane of 1935 tore through the Keys leaving few survivors. The storm damaged both the railroad and the highway providing the opportunity for the two to converge. The Overseas Highway project scavenged material and roadbed from Flagler's bankrupt railway.¹⁰ With its completion came a transition away from watercraft or railroads and towards the highway transportation that now dominates commercial activity in the Keys.

The Marker 39 Wreck

Sometime, in likely the late 19th or early 20th century, a heavily-built, flat-bottomed vessel sank in Hawk Channel, off Key Largo, at a location known as the Triangles, near Tavernier and Rodriguez Keys. The wreck site is close to Marker 39, a shallow location that has been marked as a hazard on navigation charts since 1863.¹¹ The

⁸ Viele, 1996, 99-100.

⁹ L.P. Artman, *Florida Keys Overseas Railroad: History, Pictures, Construction* (Key West: Florida Keys Printing and Publishing, 19--), 6; Brinnen S. Carter, *Preliminary Report on Two Shipwreck Sites in the Entrances to Boot Key Harbor*, Report Series #6 (Tallahassee: Florida State Program in Underwater Archaeology, 2001), 10; Viele, 1996, 99-100.

¹⁰ Viele, 1996, 133.

¹¹ A.D. Bache, *1863 Coast Chart No. 67. Florida Reefs from the Elbow to Lower Matecumbe Key, US* (Washington: Survey of the Coast of the United States, 1863), 1.

wreckage may have shifted before it sank into the sand and began to deteriorate over time.

Shipworms and tropical storms conspired to obliterate the vessel's upper works. Although most of the vertical structure is lost, a significant portion of the outer hull, floors, and ceiling planking remain. There is no apparent evidence indicating fire damage, suggesting foundering or stranding as a more likely cause of loss. The Marker 39 Wreck was probably not an abandoned vessel, since these tend to be left in areas where they will not be hazards to navigation.¹² Such a large wreck in less than 20 ft. of water could have posed a serious danger to mariners.

Cargo and any valuable machinery were most likely salvaged after the wrecking event. Substantial amounts of coal throughout the site most likely constituted the vessel's cargo. Lack of ballast and rigging suggests that it was not a sailing craft. Steam machinery is also notably absent. This lack of evidence for propulsion systems further substantiates the hypothesis that the vessel was unpowered.

With its heavy construction and flat-bottomed hull, the Marker 39 Wreck was likely a barge. De Kerchove defines a barge as: "flat-bottomed rigged or unrigged craft of full body and heavy construction...specially adapted for the transportation of bulky freight such as coal, lumber, sand, stone, and so on."¹³ Photographs of barges

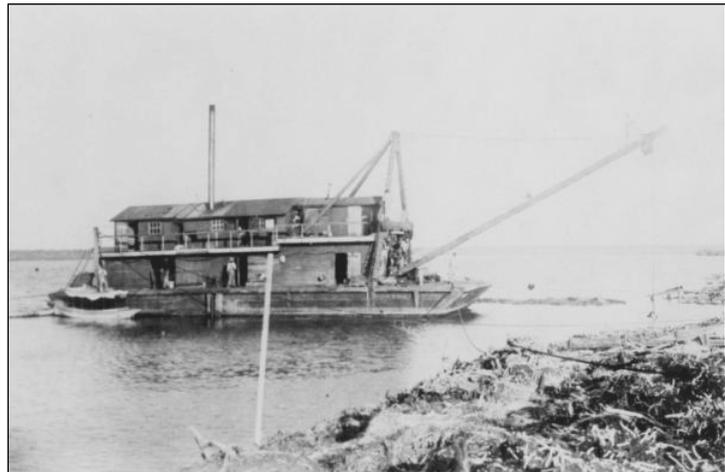


Figure 14: Dredge Barge used in Overseas Extension, 1906. (Courtesy of State Library and Archives of Florida, Florida Photographic Collection)

used in the construction of the Overseas Railroad show them in a wide variety of uses. Identifiable cargos include rock, fresh water, gasoline, and railroad ties. Local barges

¹² Nathan Richards, *Ships' Graveyards: Abandoned Watercraft and the Site Formation Process* (Gainesville: University Press of Florida, 2008), 84-85.

¹³ Rene De Kerchove, *International Maritime Dictionary*, 2nd ed. (New York: Van Nostrand Reinhold Company, 1961), 42.

were also modified or specifically built for use as dredges, cement mixers, even houseboats (Fig. 12).¹⁴ If it was contemporaneous, the Marker 39 Wreck would have been useful in hauling the type of materials needed to construct the Overseas Railroad and/or the Overseas Highway.

The Florida East Coast Railroad owned many of the barges used in constructing

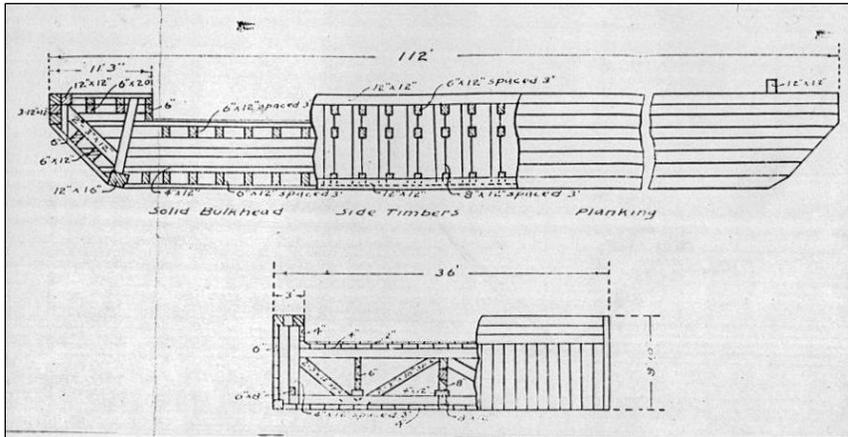


Figure 15: Lighter Plan. (Courtesy Dan Gallagher Manuscript Collection).

the railway. The Marker 39 Wreck is more heavily-built than the lighters and barges detailed in early 20th Century construction plans from the FEC. For example, one of those watercraft was

100 ft. in length but its floor timbers are only 4 in. by 6 in., another is 112 ft. long with 6 in. by 12 in. floor timbers, whereas the Marker 39 Wreck has floor timbers as large as 13 in. by 13 in., which are massive in comparison (Fig. 15).¹⁵

The Marker 39 Wreck has as yet to be identified. Researchers consulted a database compiled by Dr. Jim Miller from existing historical sources of ship groundings and losses in the Florida Keys.¹⁶ It contains listings of vessels that grounded or were wrecked in the area of the Triangles, but all are recorded as unknown in the vicinity of the Marker 39 Wreck. A cultural resources inventory of the Upper Keys did not list any named wrecks in the Triangles area.¹⁷ Compendiums such as Berman's *Encyclopedia of American Shipwrecks* also lacked references to wrecks in the area that are likely to provide an identification.¹⁸ One of the Overseas Railroad's houseboats was lost in Hawk

¹⁴ Gallagher, 2003, 6.

¹⁵ *Specifications of 25' X 100' Lighter* (Marathon: Dan Gallagher Manuscript Collection, 19--); *Lighter Plan* (Marathon: Dan Gallagher Manuscript Collection, 19--)

¹⁶ James J. Miller, *Atlas of Maritime Heritage Resources: Florida Keys National Marine Sanctuary*, (Tallahassee: James J. Miller, 2007)

¹⁷ Charles Beeker, Robert Richardson, Ryan Singleton, and Lynn Uhls. *Upper Keys Region, Florida Keys National Marine Sanctuary, Hayes Cultural Resource Report* (Bloomington: Indiana University 1997)

¹⁸ Bruce D. Berman, *Encyclopedia of American Shipwrecks* (Boston: Mariners Press, 1972)

Channel in 1906, resulting in the death of between 84 and 111 workers, although some sources report that the vessel was blown out to sea.¹⁹ In any case, the houseboat did not have bulkheads, a feature that the Marker 39 Wreck apparently did have.²⁰ At least six barges “of sturdy construction” were lost in the same storm.²¹ Although moored over 25 miles away at Long Key, they cannot be completely ruled out as candidates for identification given the destructive force of the 1906 hurricane. Consultation with Jerry Wilkinson of the Upper Keys Historic Preservation Society, Monroe County Archivist Tom Haimbright, and historian Dan Gallagher did not reveal any likely candidates for the wreck.

Recommendations

This report provides the results of an archaeological and biological examination of the Marker 39 Wreck. The Marker 39 Wreck represents a heavily constructed bulk carrier that may have been utilized during a time of major economic transition for the Florida Keys. Part of the Marker 39 Wreck is preserved beneath the sand, but much of its wooden structure is exposed to the active shallow water environment. It is recommended that FKNMS staff visit the site periodically to monitor its condition and record any changes to its situation. Should a significant degree of degradation or disarticulation become apparent, planning for further documentation should be undertaken immediately. Without appropriate measures for resource management, this site could become lost to time and nature.

¹⁹ Pat Parks, *The Railroad that Died at Sea: The Florida East Coast Railway's Extension* (Brattleboro: The Stephen Greene Press, 1968), 10; P.J. Hinton, *Statement of Finding of Fact of Death: Carlos Morrow, July 25, 1940* (Marathon: Dan Gallagher Manuscript Collection, 1940).

²⁰ Ernest D. Cavanaugh, *Deposition of William George Brennan, February 14, 1940* (Marathon: Dan Gallagher Manuscript Collection, 1940), 2.

²¹ Cavanaugh, 1940, 2.

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Appendix I: Newspaper Article

MIAMI HERALD

Posted on Saturday, 06.13.09

Science aids inventory of Florida Keys shipwrecks

Archaeologists and biologists cooperate to explore, date and map the hundreds of shipwrecks off the South Florida coast.

BY LISA ORKIN EMMANUEL

Associated Press

About 18 feet underwater off Key Largo lies a mystery ship, one of hundreds in just these waters.

Its cargo, name and destination are unknown. All that remains of the wreck are planks of timber, iron rods and some pieces of coal.

State underwater archaeologist Roger Smith and his team will spend about two weeks mapping the site that has become a bountiful coral reef. In time they will also try to piece together what ship this was, its voyage and whether it should be nominated for the National Register of Historic Places.

The work is part of an ongoing effort to take an inventory of Florida's shipwrecks and artifacts, which number around 300 off Key Largo alone.

Named the "Marker 39" wreck for its location just two miles off Key Largo, the remains hold many clues that could help unlock its secrets. A buoy has marked the spot since 1863, which could help date the shipwreck because it could be when the ship ran aground that people realized the area was dangerous.

Iron fasteners held the wood together and from what is left, it looks like it was about 150 feet long. So far, archaeologists are hypothesizing it was a barge because of its long, flat deck. Smith predicts it dates back to the 19th century, when there was a bustling business of carrying cargo, including coal, lumber and manufactured goods, up and down Florida's coast. It may have been a steam ship because of the iron rods and steam pipes that were found on it.

'TRAP FOR SHIPS'

"The Keys is a trap for ships, always has been, always will be," Smith said. "There is all of this maritime history in the Keys. All these shipwrecks represent episodes in that history."

The wreck was found in the 1990s by two volunteers diving along the channel between the shore and the large coral reef that runs parallel to the Keys.

Experts say there are about 400 ship groundings a year, some due to captain inexperience, some to weather and changes in water depth.

Smith says that when he dives a wreck, he is always looking for man-made objects to tell the story. He believes salvors of the 19th century may have beaten him to any on this wreck. Some salvors were fishermen and they would wait for a ship in trouble, then go get the goods to keep a share.

"The law was, if you were the first salvor to negotiate with the captain, you got to be the salvor," he said.

In a Florida Master Site File, all the state's historic sites are listed for inventory. This wreck will get a number there.

The group has created a photo mosaic of the site. They will also map the wreck and shoot video for people who will never dive it.

`DETECTIVE WORK'

They will then take the pieces of coal they have brought ashore to the Florida Geological Survey and search in the archives of admiralty courts to see if they can find out what ship this is.

"Sometimes you never do find the name of a ship," Smith said.

This particular ship is not very well-preserved. It's exposed to the elements and not totally buried.

"Part of all this is detective work and making conclusions based on hard evidence," he said. "You have to let the shipwreck tell its own story. Sometimes it's tempting to hypothesize what a site might be."

There are several references to ships going down in the area, said Brenda Altmeier, program support specialist at NOAA's Florida Keys National Marine Sanctuary.

She says she "can't help but think of the people aboard . . . just the fear and panic," she said.

This project is a partnership between the Division of Historical Resources and the sanctuary.

"It's merging two sciences. It's biology merging with archaeology," she said.

So far it's known this wasn't a sailing ship, senior archaeologist Franklin Price said. It had no ballast or evidence of rigging to hold up a mast or sails.

Smith said there are many filters archaeologists have to get past when analyzing a wreck, including time, the sea and animals.

But the wreck has also become a breeding ground for new life. It is a bustling reef with hard and soft coral and home to many different kinds of fish including a great barracuda, a scorpion fish and even a spotted eagle ray.

Smith has also devised a seminar to educate dive trainers about respecting Florida shipwrecks.

"We find, as archaeologists, that there isn't any future, it's just the past repeating itself," he said.

<http://www.miamiherald.com/news/florida-keys/story/1095092.html>)

For more news on the Marker 39 Wreck please visit:

<http://www.news-press.com/apps/pbcs.dll/gallery?Avis=A4&Dato=20090611&Kategori=NEWS01&Lopenr=906110804&Ref=PH>)

Appendix II: Biological Inventory

Species observed on site, with their scientific names and population counts

Corals

Knobby Star Coral	<i>Montastraea annularis</i>	(Mann)	(2)
Mountain (Mountainous) Star Coral	<i>Montastraea faveolata</i>	(Mfav)	(14+)
Blushing Star Coral	<i>Stephanocoenia intersepta</i>	(Smich)	(15+)
Smooth (Massive) Starlet Coral	<i>Siderastrea siderea</i>	(Ssid)	(22+)
Rough (Lesser) Startlet Coral	<i>Siderastrea radians</i>	(Srad)	(9+)
Smooth Star Coral	<i>Solenastrea bournoni</i>	(Sbourn)	(14+)
Mustard Hill Coral	<i>Porites astreoides</i>	(Past)	(23+)
Finger Coral	<i>Porites porites</i>	(Ppor)	(12+)
Finger Coral	<i>Porites divaricata</i>	(Pdiv)	(4)
Lettuce Coral	<i>Agaricia agaricites</i>	(Aaga)	(13+)
Lettuce Coral	<i>Agaricia agaricites</i> forma <i>purpurea</i>	(plating)	(1+)
Encrusting Fire Coral	<i>Millepora alcicornis</i>	(Malc)	(17+)
Flower Cup Coral	<i>Eusmilia fastigiata</i>	(Efast)	(11+)
Smooth (Symmetrical) Brain Coral	<i>Diploria strigosa</i>	(Dstrig)	(3+)
Ivory Bush Coral	<i>Oculina diffusa</i>	(Odiff)	(12+)
Giant Brain Coral	<i>Colpophyllia natans</i>	(Cnat)	(9+)
Labyrinth (Grooved) Brain Coral	<i>Diploria labyrinthiformis</i>	(Dlab)	(7+)
Golfball Coral	<i>Favia fragum</i>	(Ffrag)	(7+)
Boulder Star Coral	<i>Montastraea franksi</i>	(Mfrank)	(4)
Cavernous (Great) Star Coral	<i>Montastraea cavernosa</i>	(Mcav)	(1+)
Elliptical Star Coral	<i>Dichocoenia stokesii</i>	(Dsto)	(2)
Butterprint (Maze) Coral	<i>Meandrina meandrites</i>	(Mmean)	(1)
Tube Coral	<i>Cladocora arbuscula</i>	(Clad)	(1)
Ten-Ray Star Coral	<i>Madracis decactis</i>		(1)



Figure 16: Giant Brain Coral (*Colpophyllia natans*)

Soft Coral/Gorgonians

Sea Plume <i>Pseudopterogorgia americana</i>	(Pseudo amer)	(12+)
Purple Sea Fan <i>Gorgonia ventalina</i>	(Gven)	(14+)
Porous Sea Rod <i>Psuedoplexaura</i> sp.		(2+)
Giant Slip-Pore Sea Rod <i>Plexaurella nutans</i>		(9+)
Black (brown) Sea Rod <i>Plexaura homomalla</i>		(1)
Knobby Sea Rod <i>Eunicea</i> sp.		(2)
Encrusting Gorgonian <i>Erythropodium caribaeorum</i>		(4+)



Figure 17: Gorgonia and Porkfish (*Anistronemus viridicus*)

Sponges

Orange Boring Sponge <i>Cliona delitrix</i>	(Cliona del)	(18+)
Yellow Finger (Rope) Sponge <i>Aplysina fulva</i> (possibly?)		(4+)
Black Ball Sponge <i>Ircinia strobilina</i>		(1+)
Vase Sponge (unidentified, possibly <i>Xestospongia muta</i>)		(1+)
Red tube sponge (unidentified, possibly <i>Aplysina</i> sp.?)		(2+)
Red veined sponge (unidentified, possibly <i>Monanchora</i> sp.?)		(2)

Invertebrates

Arrow Crab <i>Stenorhynchus seticornis</i>		(5+)
Large Hermit Crab (possibly <i>Dardanus venosus</i> or <i>Paguristes erythrops</i>)		(1)
Black Long-spined Sea Urchin <i>Diadema antillarum</i>	(Diadema)	(5+)
Reef Urchin <i>Echinometra viridis</i>		(1)
Unidentified Red Urchin		(1)
Ringed (Corkscrew) Anemone <i>Bartholomea annulata</i>		(5+)
Pink-Tipped (Giant Caribbean) Anemone <i>Condylactis gigantean</i>		(6+)

Green Sea Mat <i>Zoanthus sociatus</i>	(1 colony)
Florida Spiny Lobster <i>Panulirus argus</i>	(2)
Pederson Cleaning Shrimp <i>Periclimenes pedersoni</i>	(5+)
Flame Scallop <i>Lima scabra</i>	(2)
Christmas Tree Worm <i>Spirobranchus giganteus</i>	(10+)
Feather Duster Worm <i>Anamobaea orstedii</i>	(1)
Tiger Tail Sea Cucumber <i>Holothuria thomasi</i>	(2)
Star Horseshoe Worm <i>Pomatostegus stellatus</i>	(5+)

Macro Algae

Green calcareous (Watercress) algae <i>Halimeda</i> sp. (<i>H. opuntia</i> , <i>H. discoidea</i>) [locally referred to as oatmeal algae]	(7+)
Brown Algae <i>Dictyota divaricata</i>	(7+)



Figure 18: Hogfish (*Lachnomaimus maximus*)

Fish

Goliath Grouper <i>Epinephelus itajara</i>	(1)
Black Grouper <i>Mycteroperca bonaci</i>	(2)
Hogfish <i>Lachnolaimus maximus</i> -- schools	(10+)
Stoplight Parrotfish <i>Sparisoma viride</i>	(2)
Spotted Scorpionfish <i>Scorpaena plumieri</i>	(1)
Bluestriped Grunt <i>Haemulon sciurus</i>	(20+)
Bar Jack <i>Caranx ruber</i>	(20+)
Smallmouth Grunt <i>Haemulon chrysargyreum</i>	(30+)
French Grunt <i>Haemulon flavolineatum</i>	(20+)
Tomtate <i>Haemulon aurolineatum</i>	(20+)
White Grunt <i>Haemulon plumierii</i>	(10+)
Great Barracuda <i>Sphyraena barracuda</i>	(1)

Gray Angelfish <i>Pomacanthus arcuatus</i>	(2)
Southern Stingray <i>Dasyatis americana</i>	(1)
Spotted Moray <i>Gymnothorax moringa</i>	(3)
Lane Snapper <i>Lutjanus synagris</i>	(40+)
Mangrove Snapper <i>Lutjanus griseus</i>	(10+)
Midnight Parrotfish <i>Scarus coelestinus</i>	(1+)
Porkfish <i>Anisotremus viridinus</i>	(5+)
Yellow Goatfish <i>Mulloidichthys martinicus</i>	(5+)
Yellowtail Snapper <i>Ocyurus chrysurus</i>	(20+)
Trumpetfish <i>Aulostomus maculatus</i>	(1)
Porcupinefish <i>Diodon hystrix</i>	(1)
Sergeant Major <i>Abudefduf saxatilis</i>	(5)
Atlantic Spadefish <i>Chaetodipterus faber</i>	(1+)
Rock Hind <i>Epinephelus adscensionis</i>	(1+)
Bluehead Wrasse <i>Thalassoma bifasciatum</i>	(1+)
Atlantic Spadefish <i>Chaetodipterus faber</i>	(2+)
Sharpnose Puffer <i>Canthigaster rostrata</i>	(2+)
Banded Butterflyfish <i>Chaetodon striatus</i>	(1+)
Blue Tang <i>Acanthurus coeruleus</i>	(2+)

Marine Plants

Turtle Grass <i>Thalassia testudinum</i>
Manatee Grass <i>Syringodium filiforme</i>